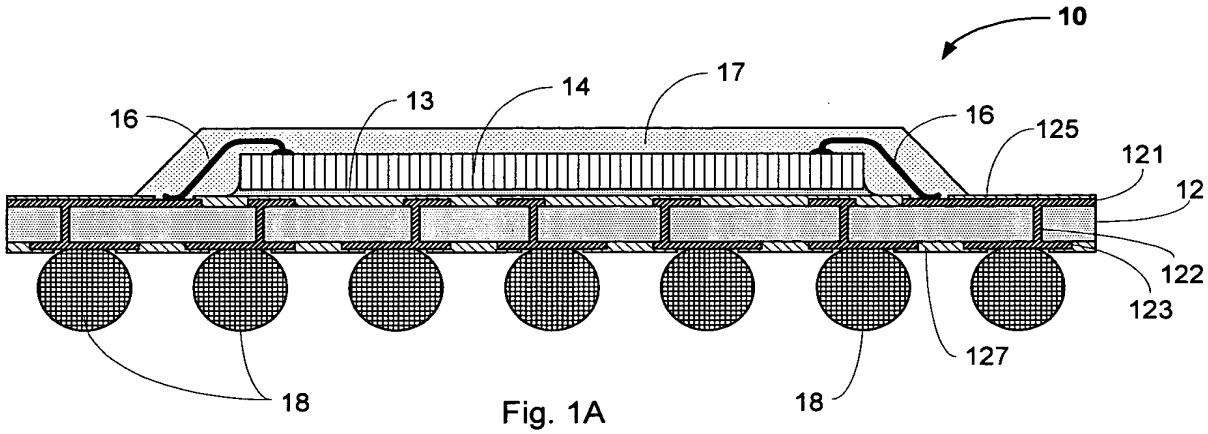

Fig. 1A
PRIOR ART

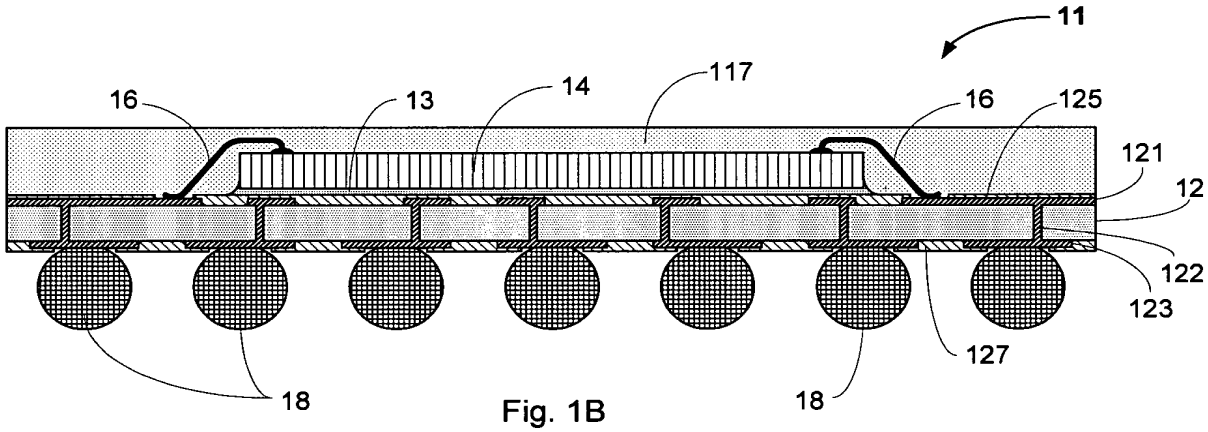

Fig. 1B
PRIOR ART

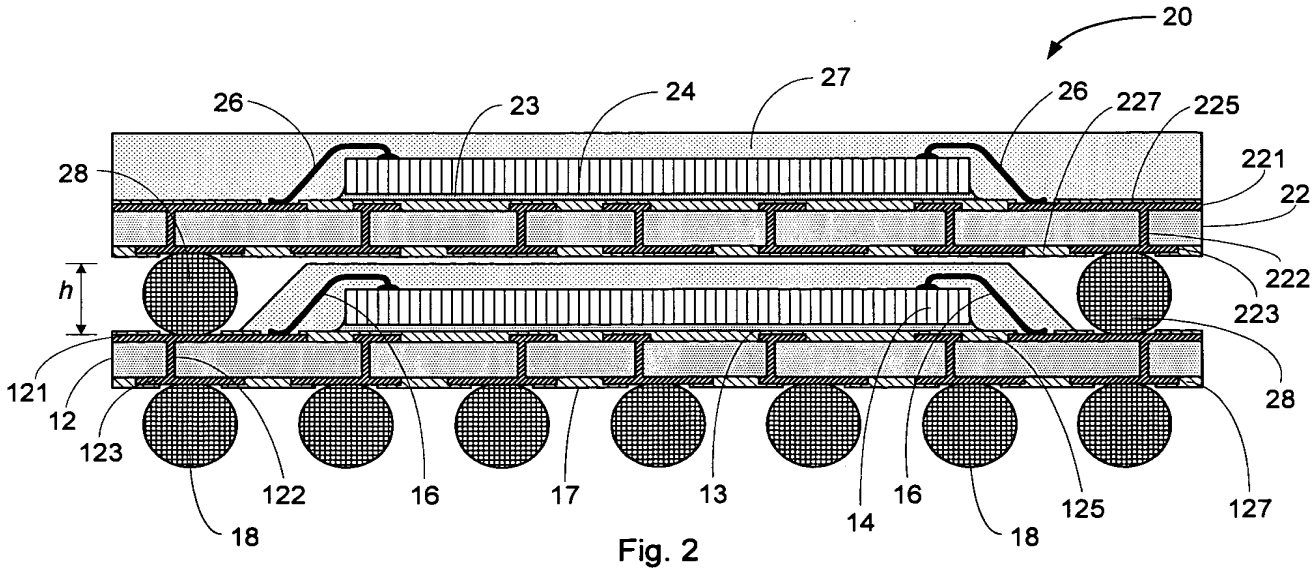

Fig. 2
PRIOR ART

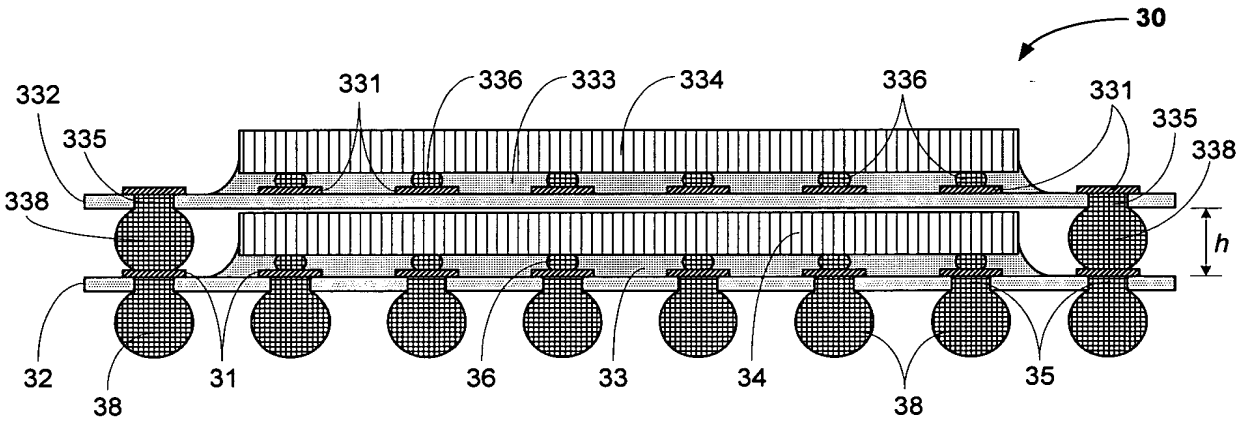

Fig. 3
PRIOR ART

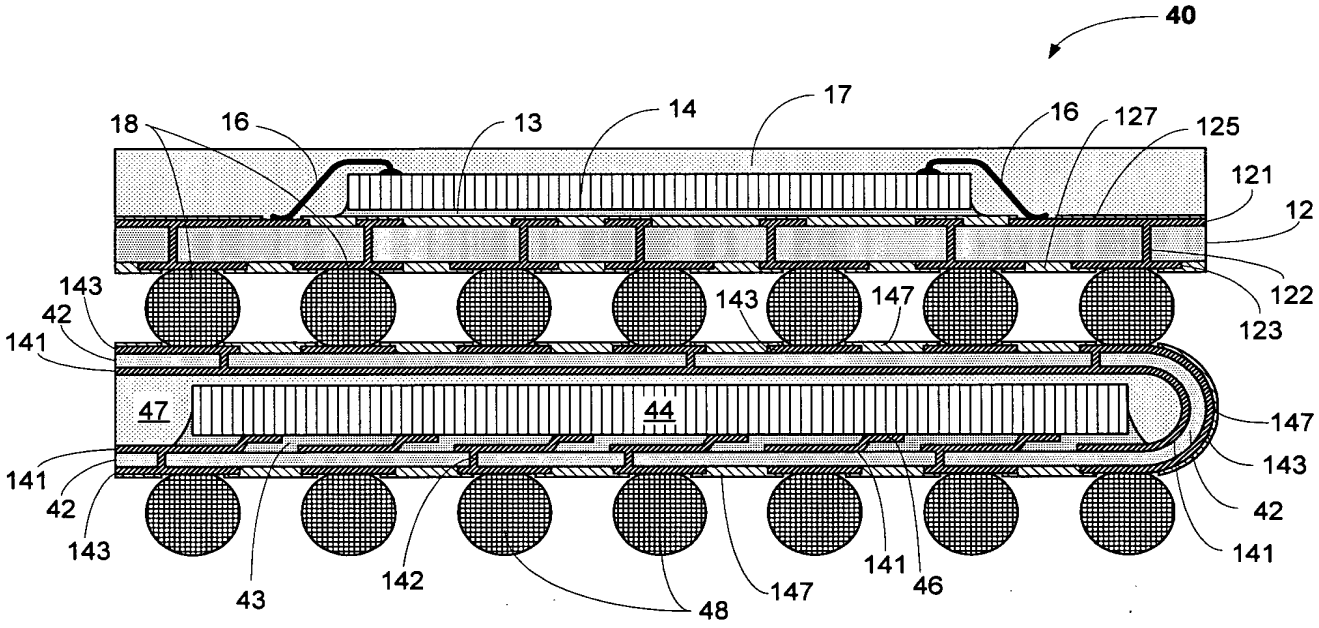

Fig. 4
PRIOR ART

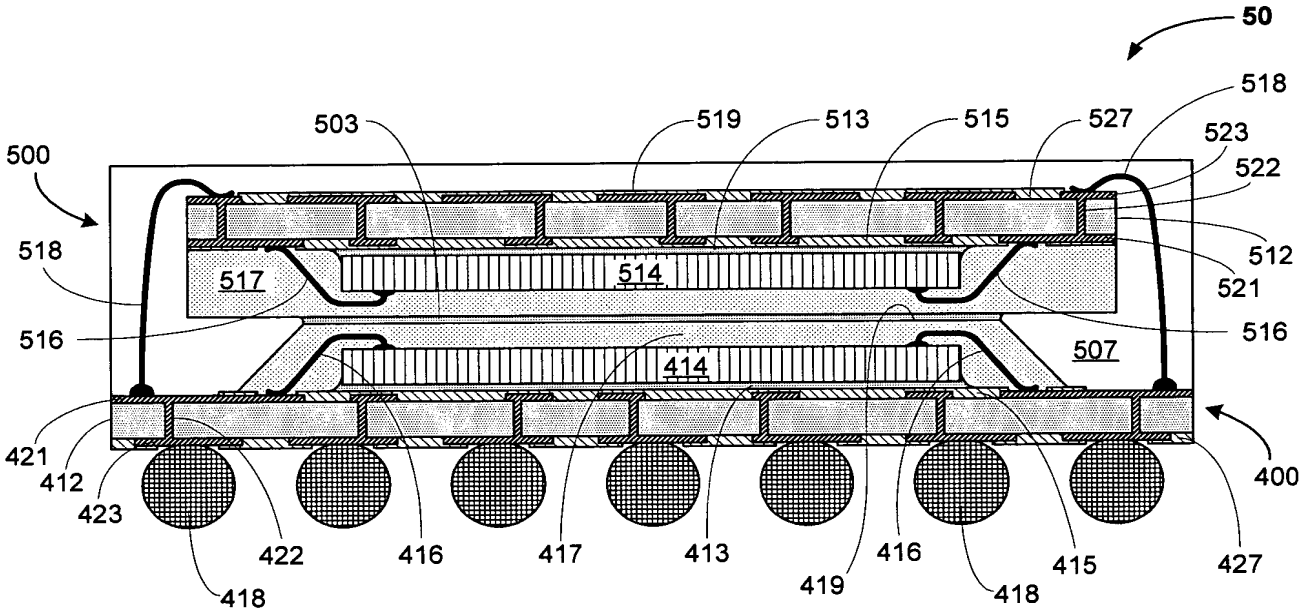
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Fig. 5A

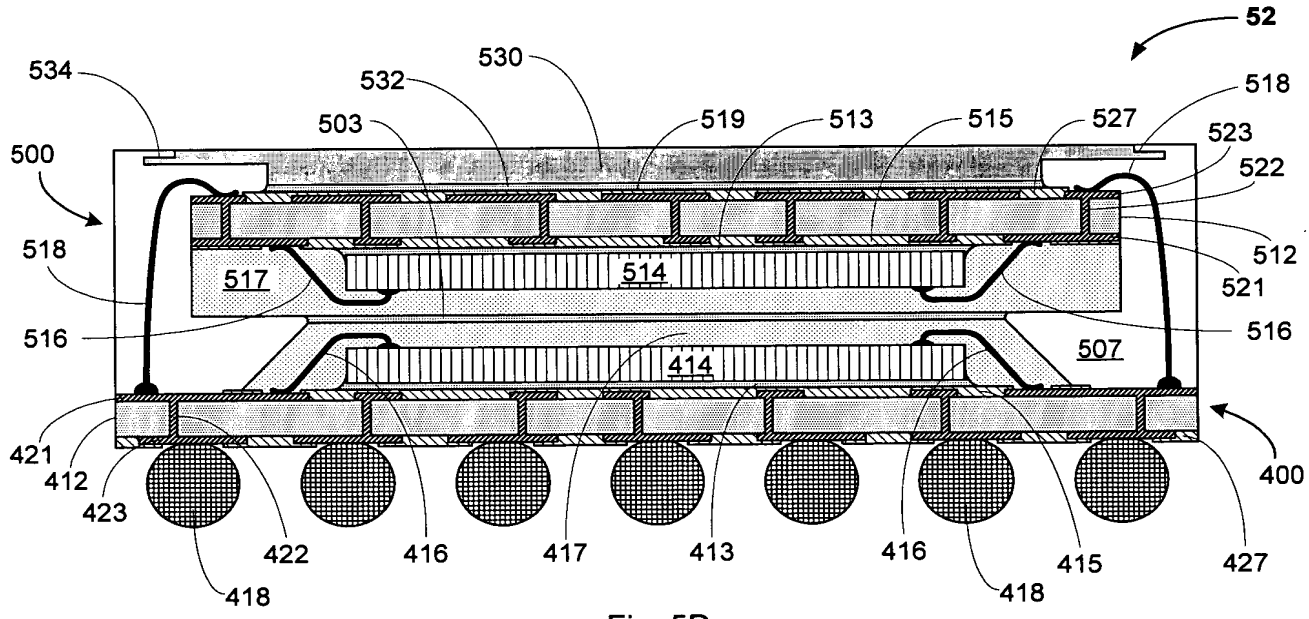
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Fig. 5D

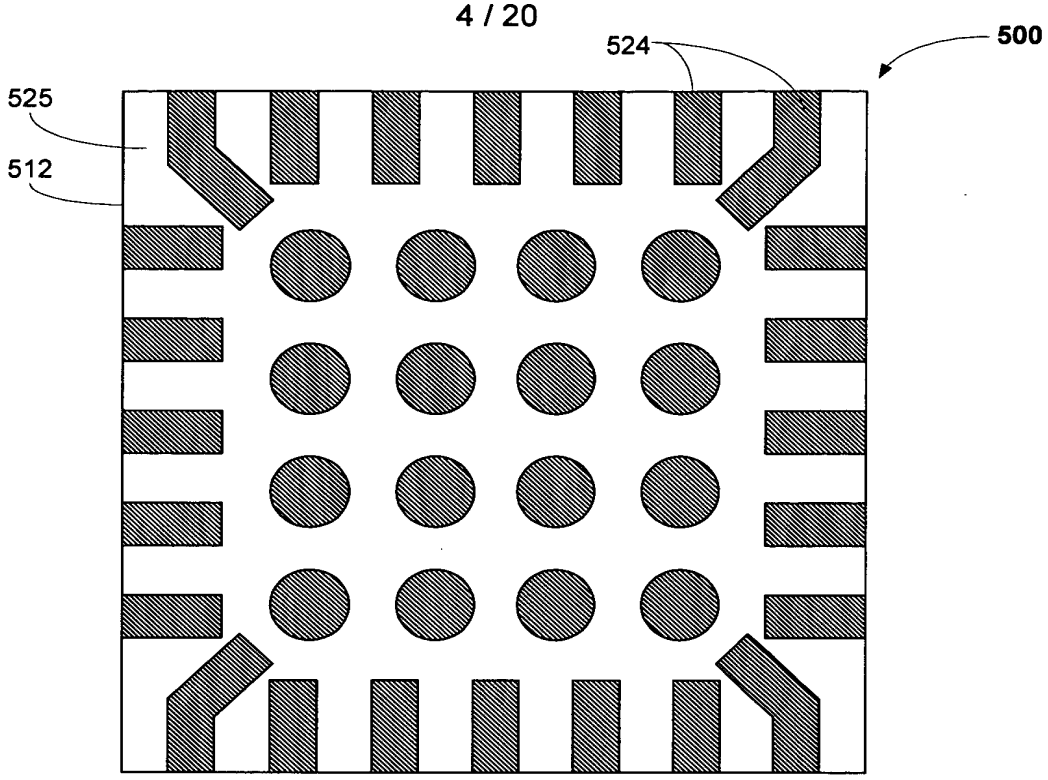
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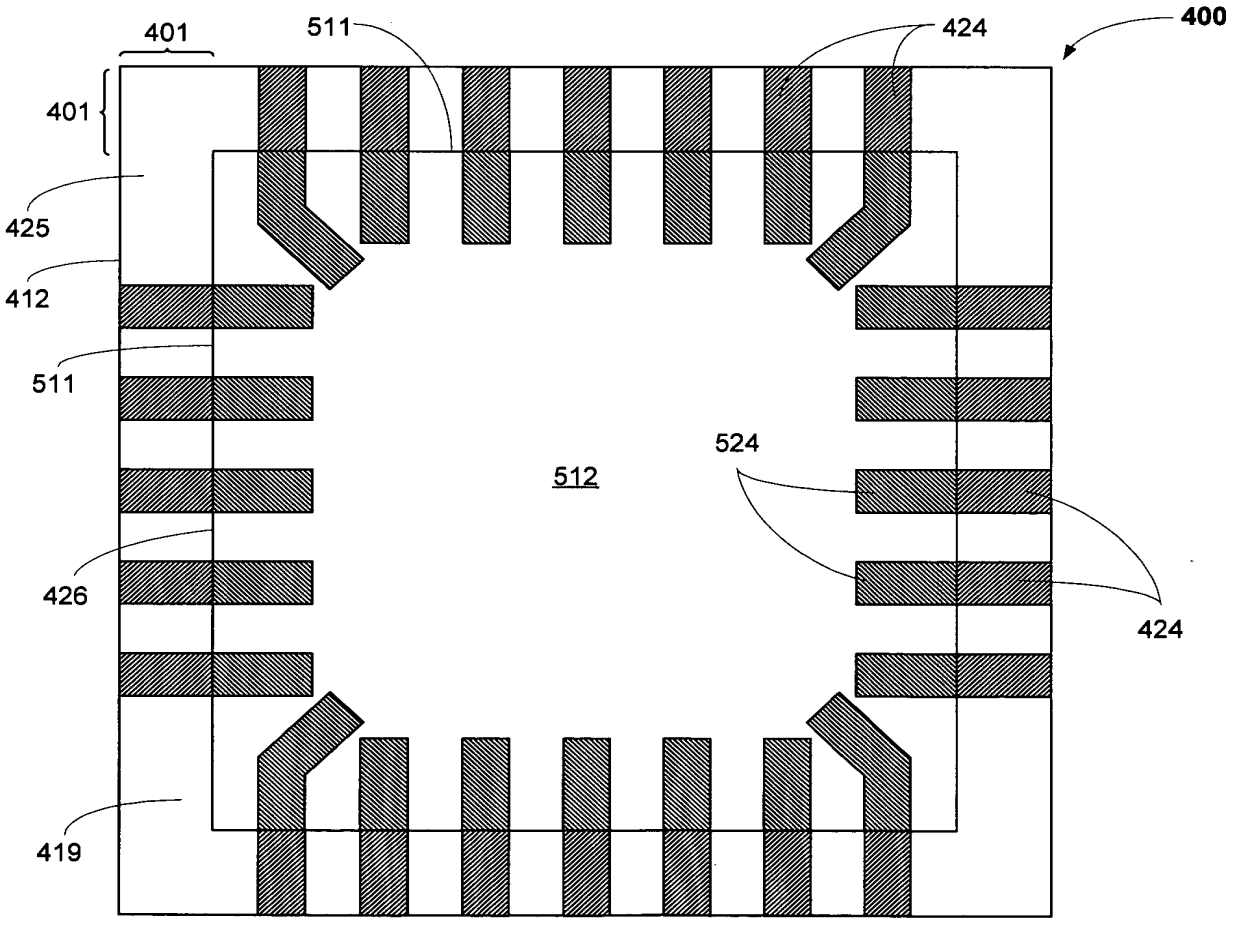
Fig. 5C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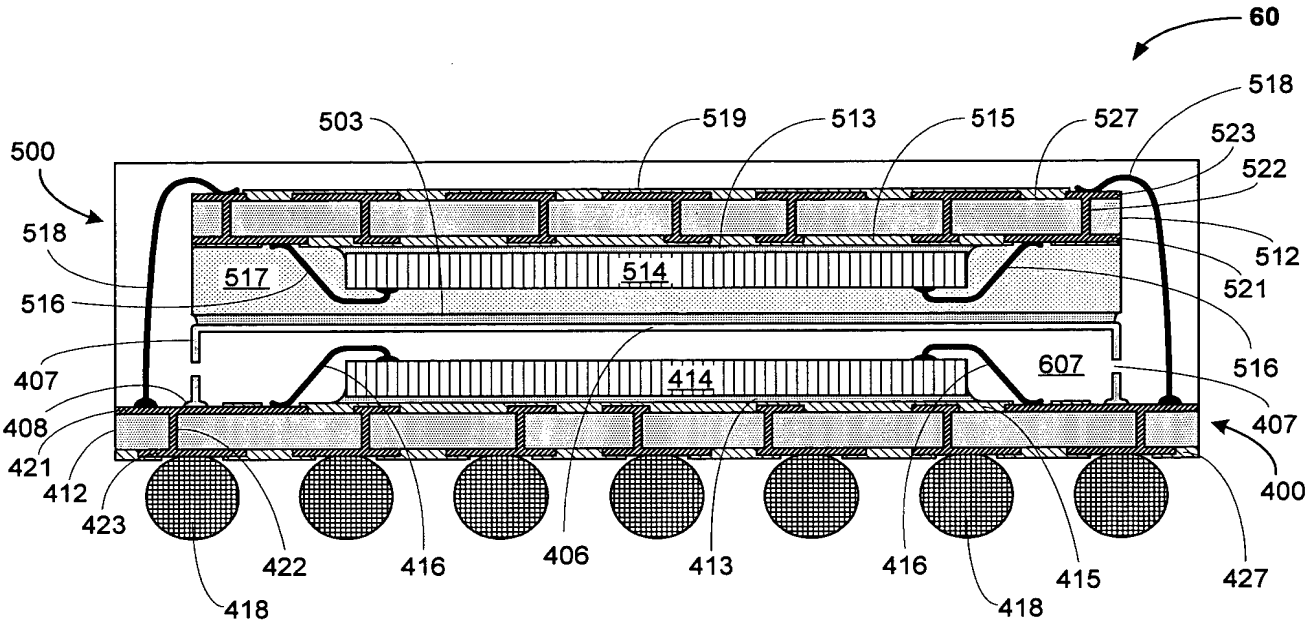
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Fig. 6A

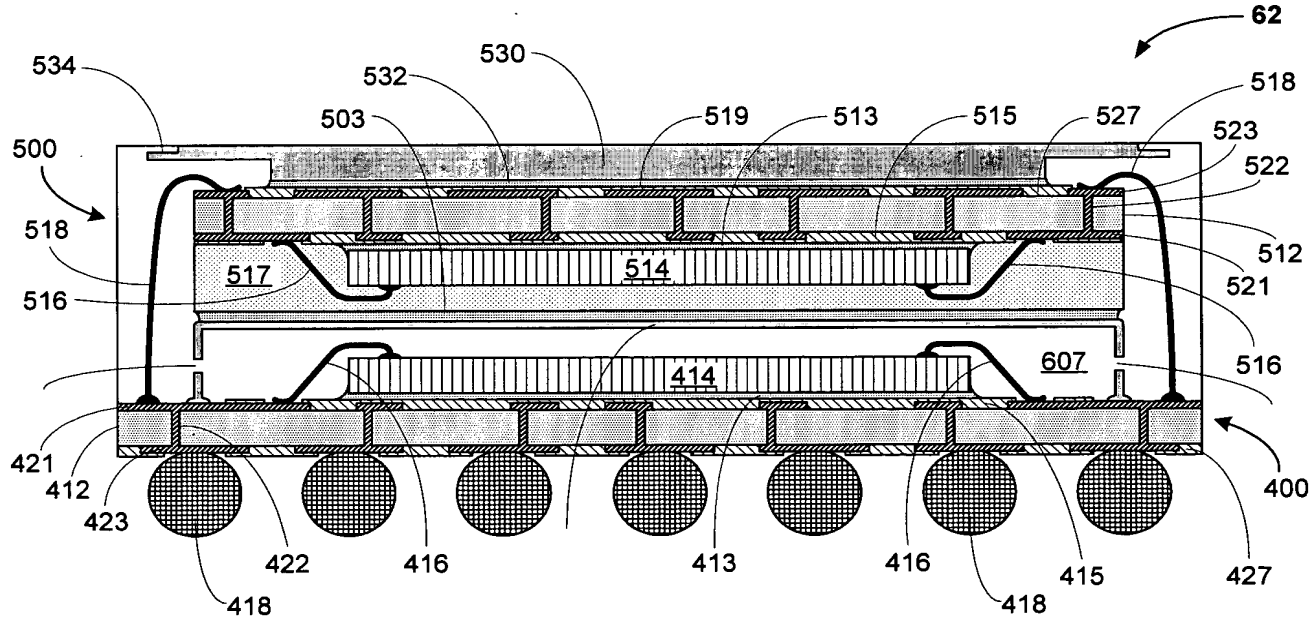
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Fig. 6B

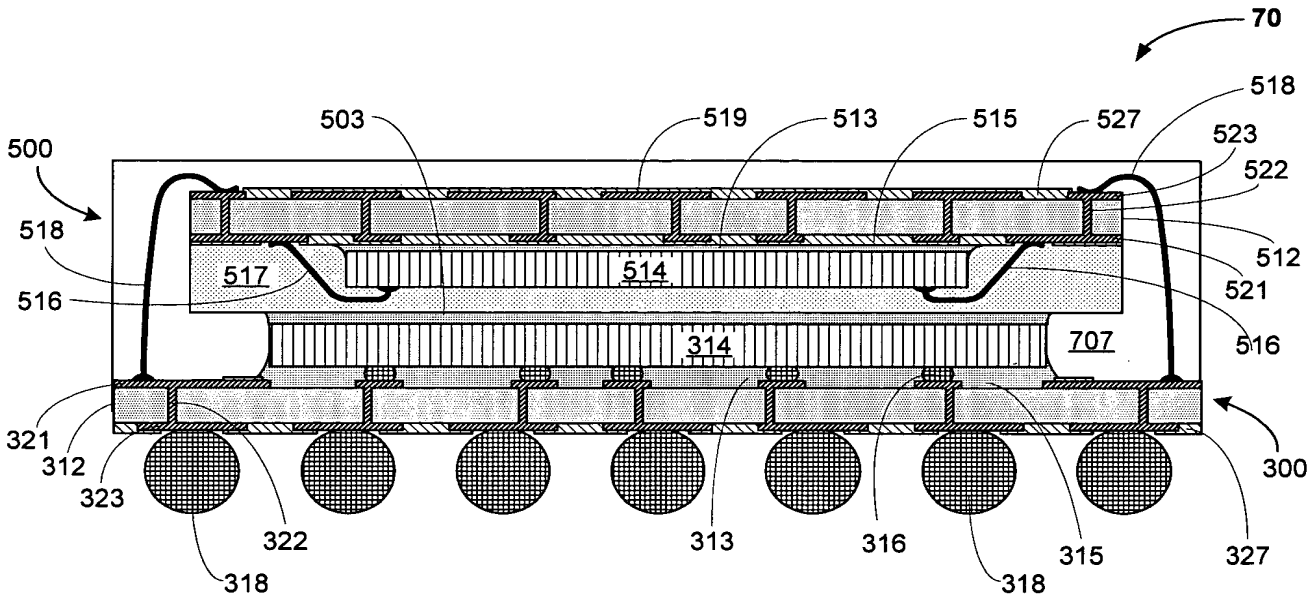
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Fig. 7A

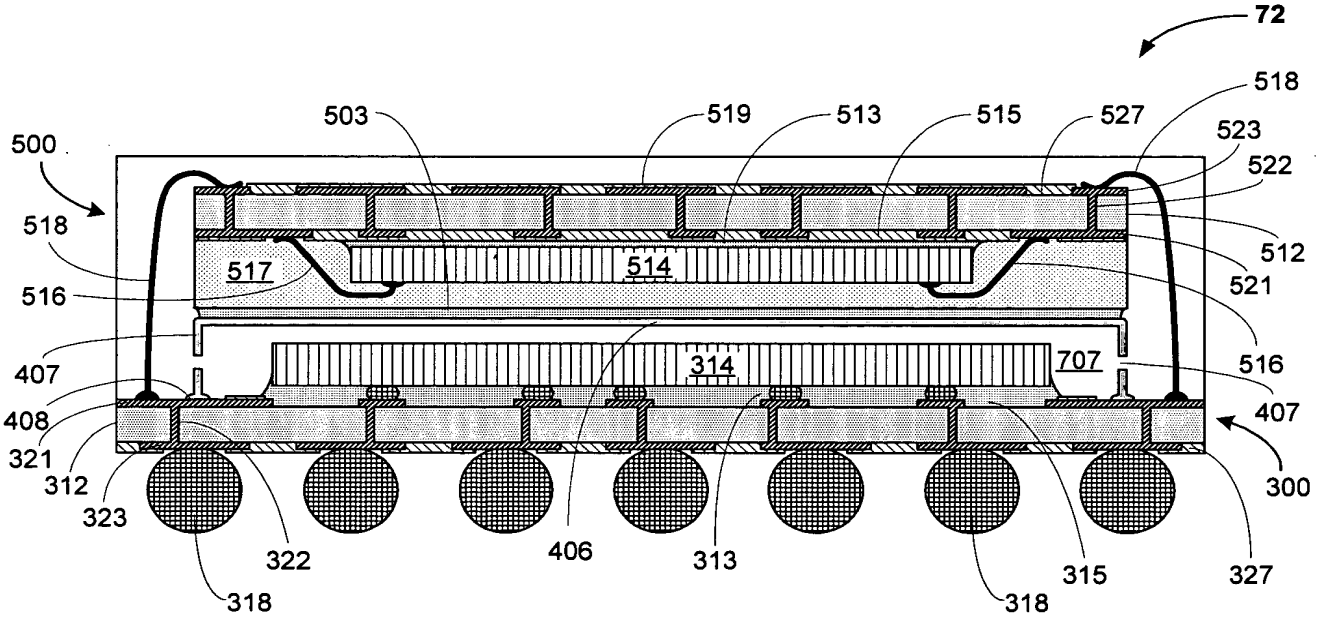
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Fig. 7B

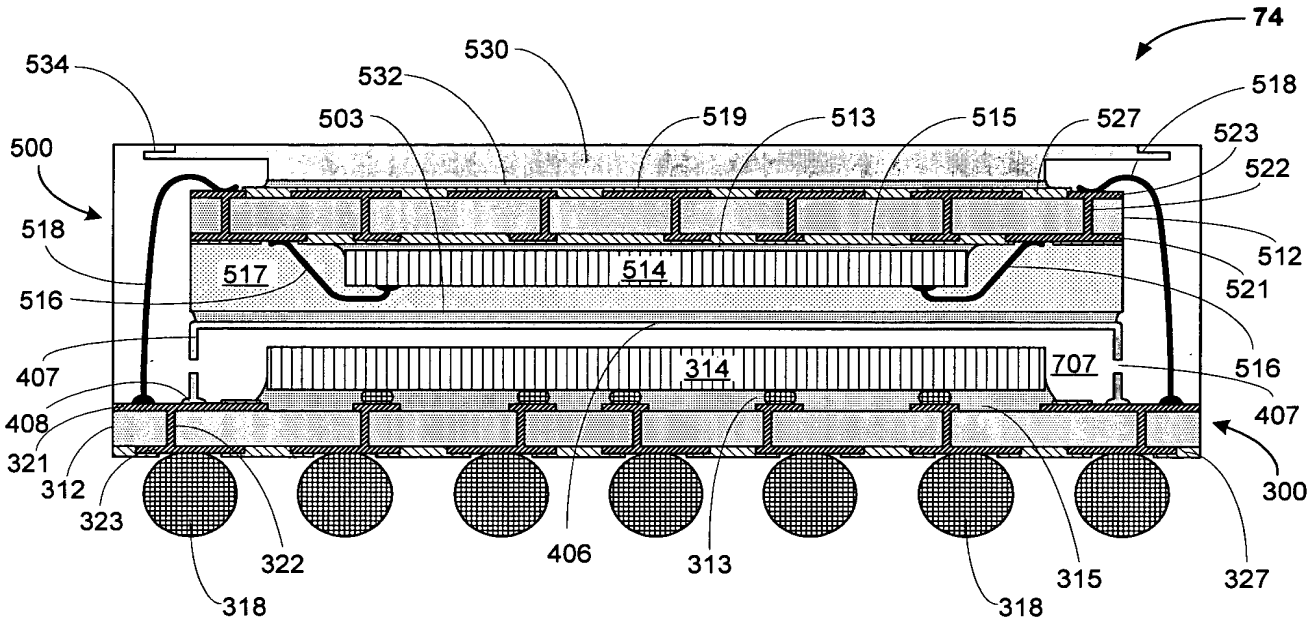
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Fig. 7C

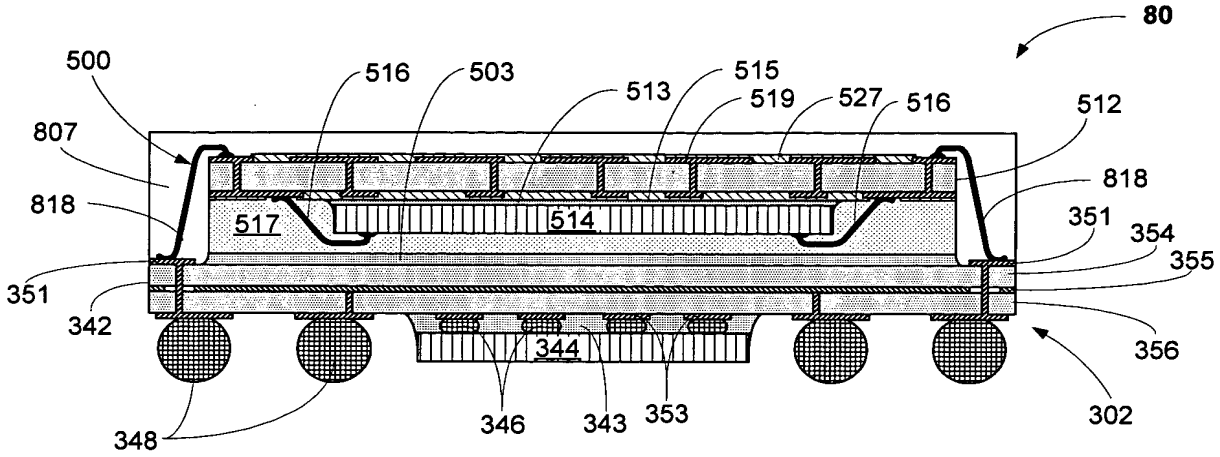
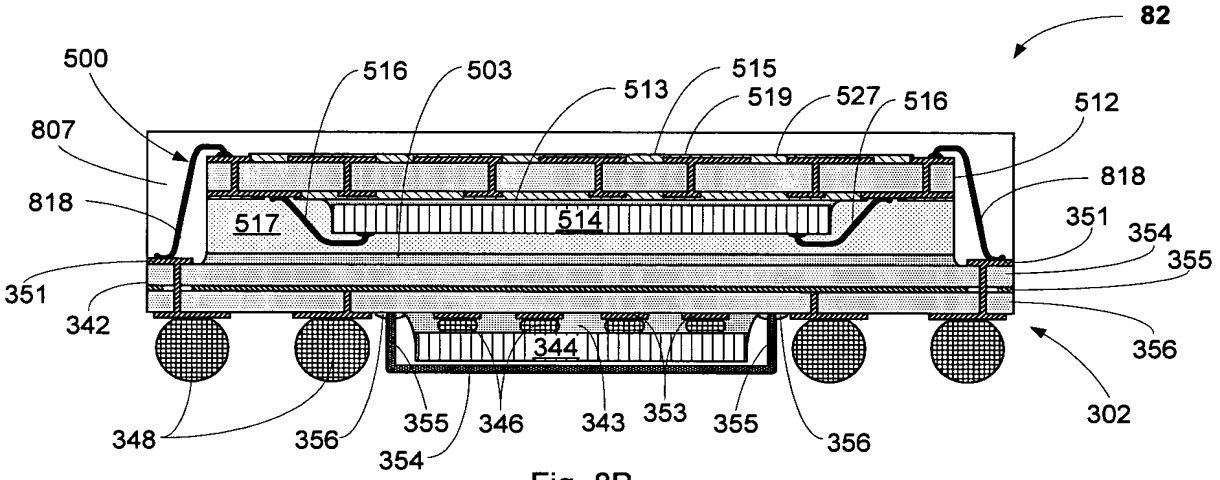


Fig. 8A



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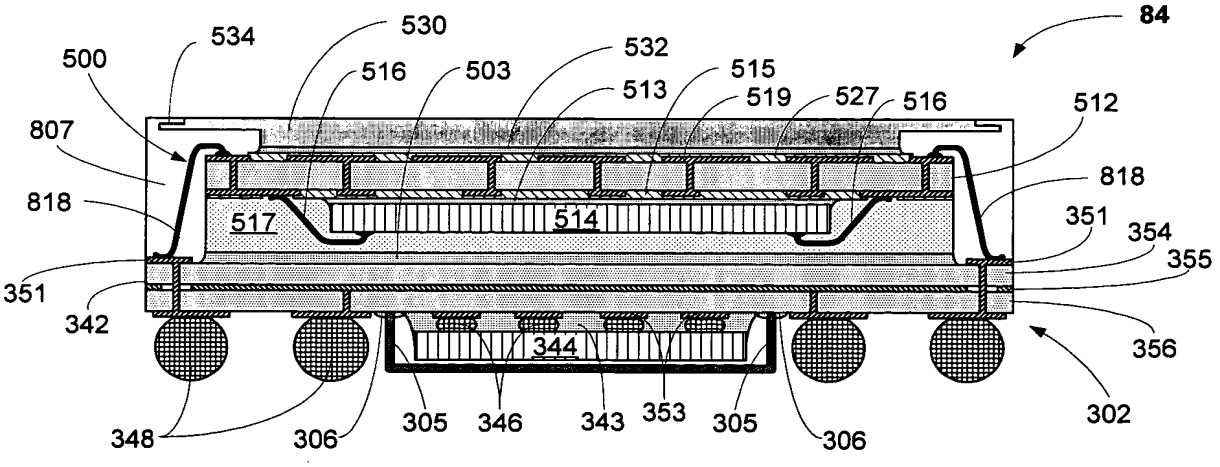

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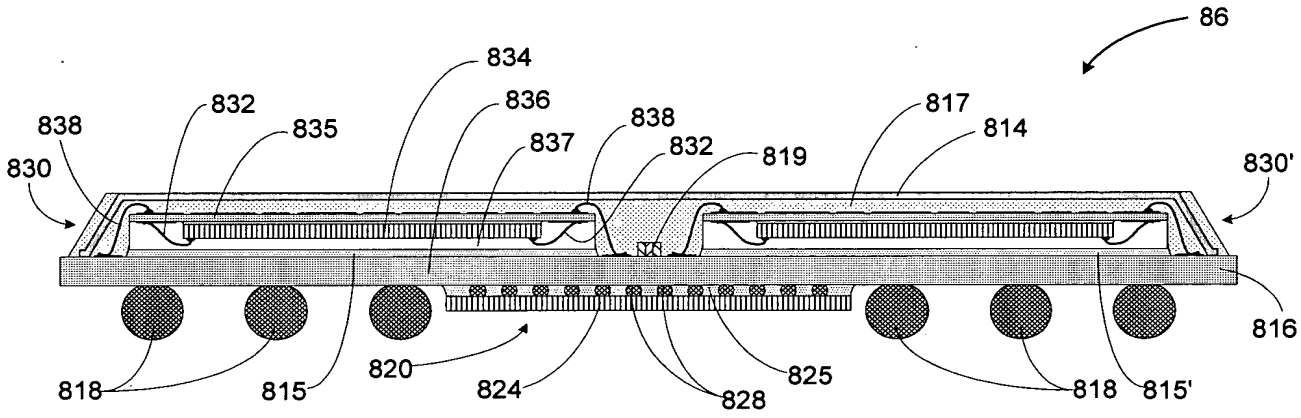
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815'

Fig. 8D

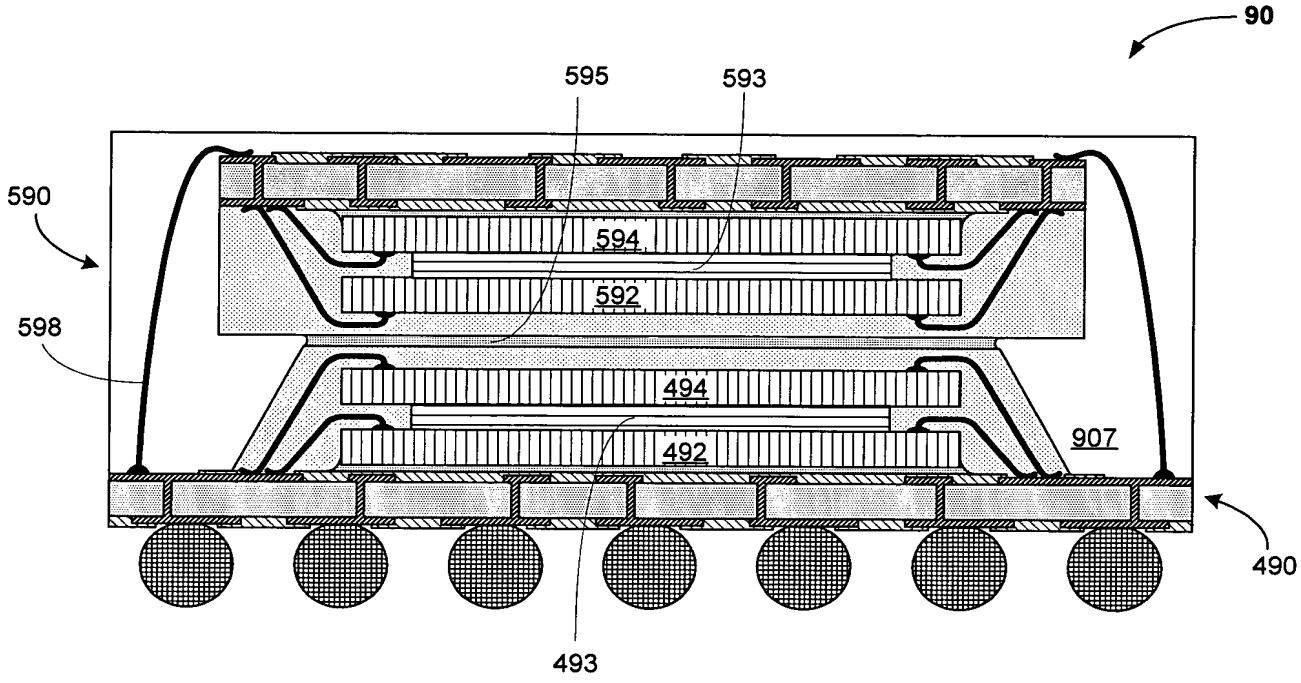
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Fig. 9A

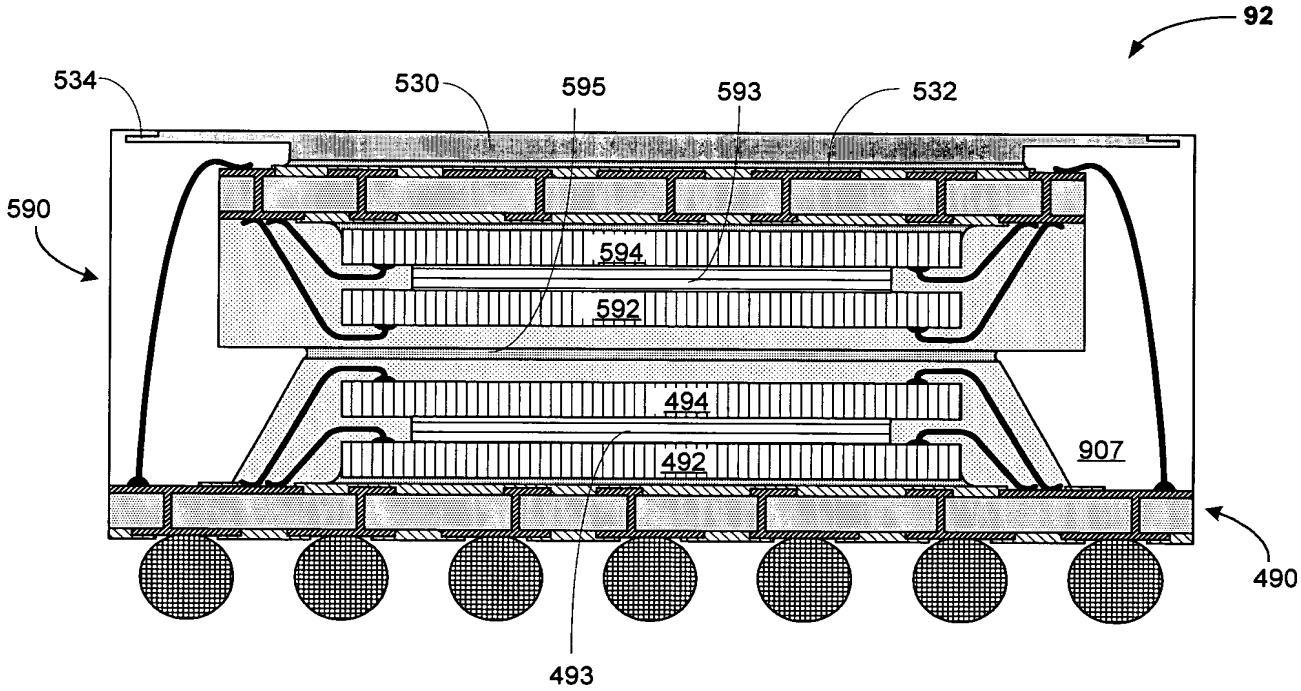
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Fig. 9B

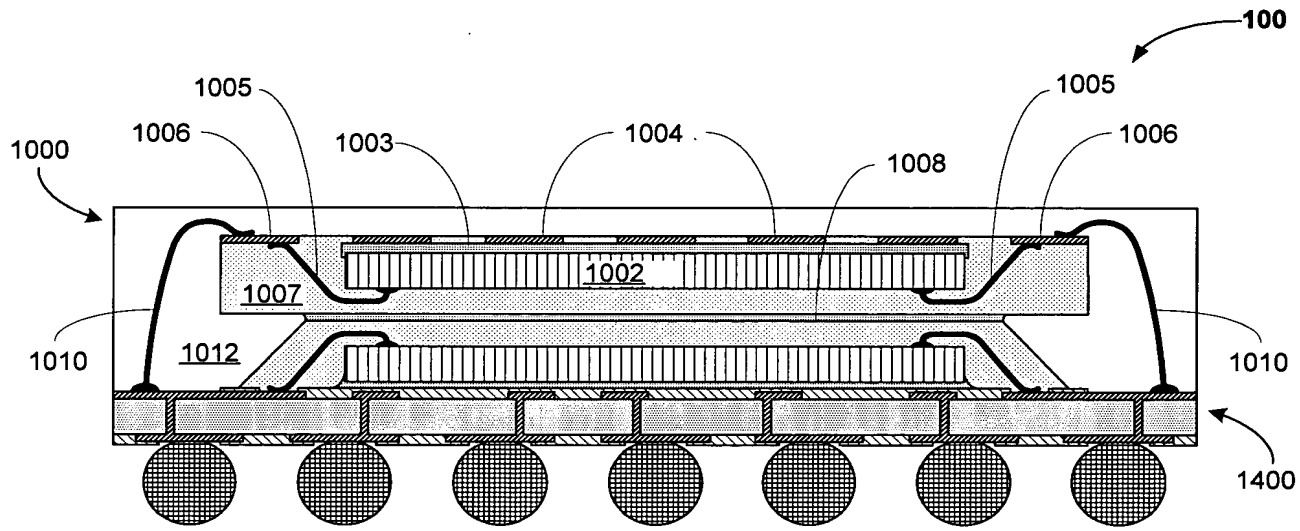


Fig. 10A

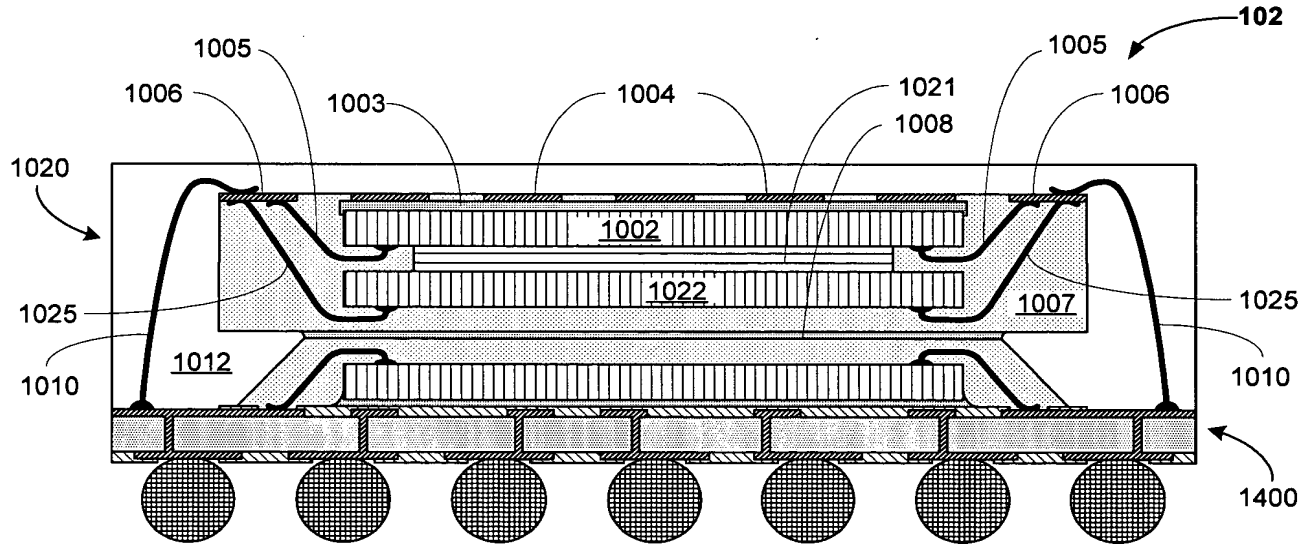


Fig. 10B

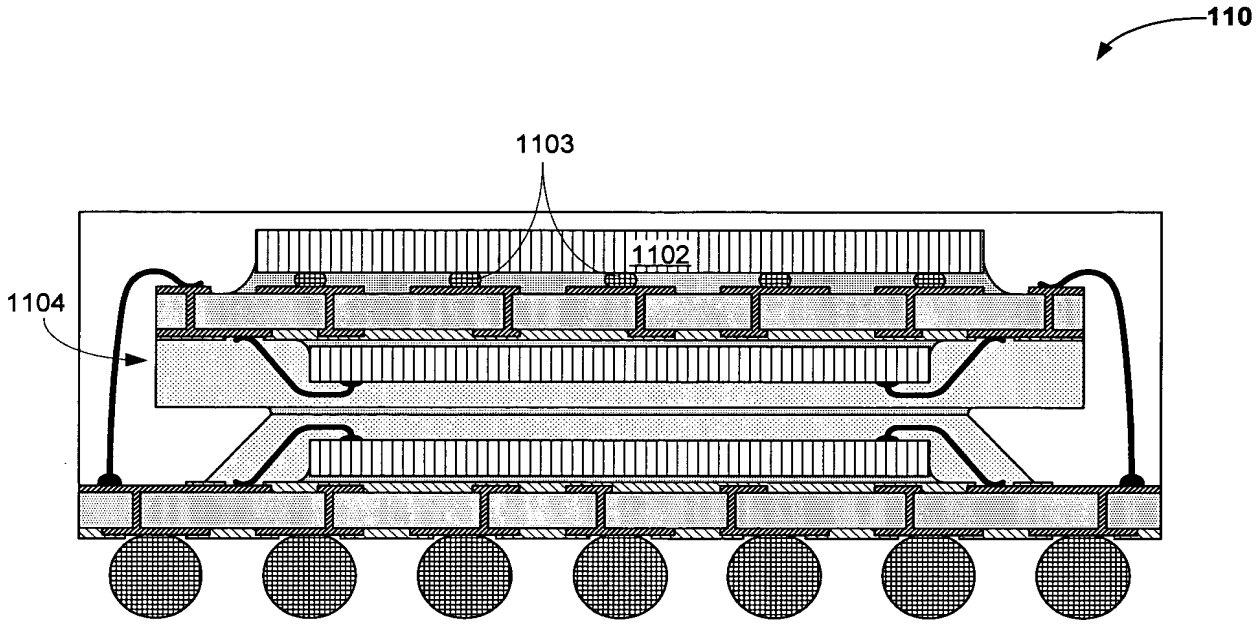


Fig. 11A

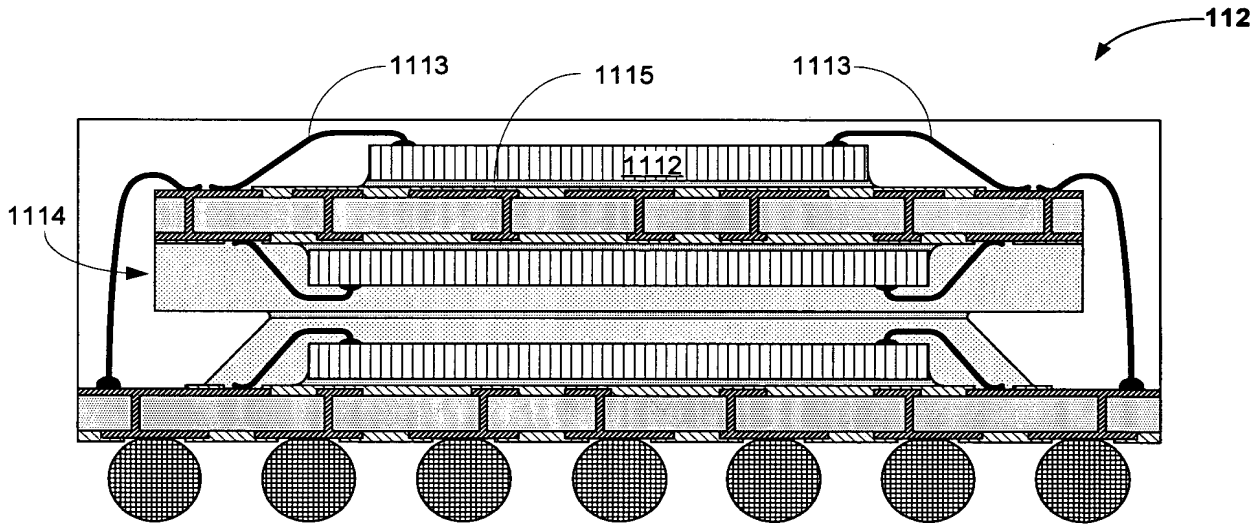


Fig. 11B

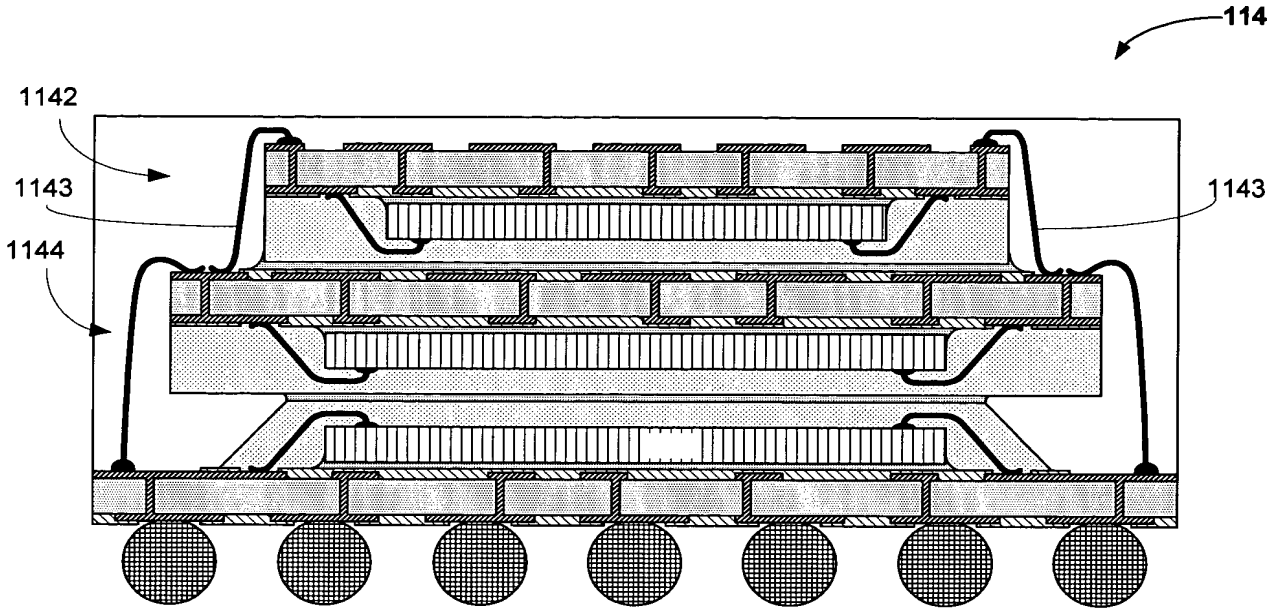


Fig. 11C

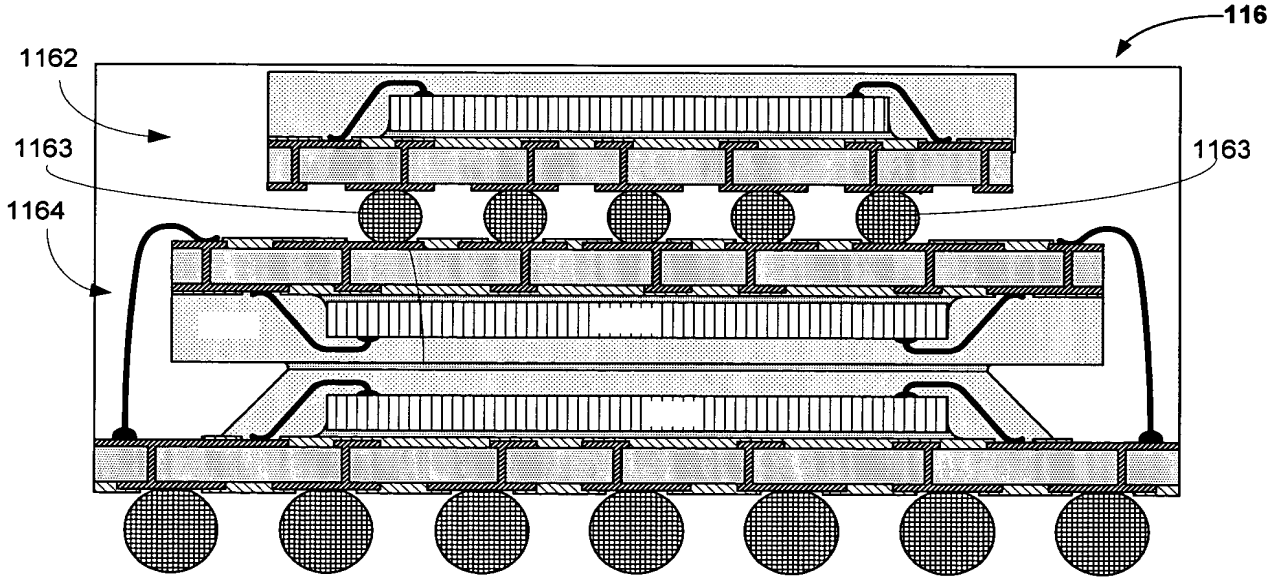
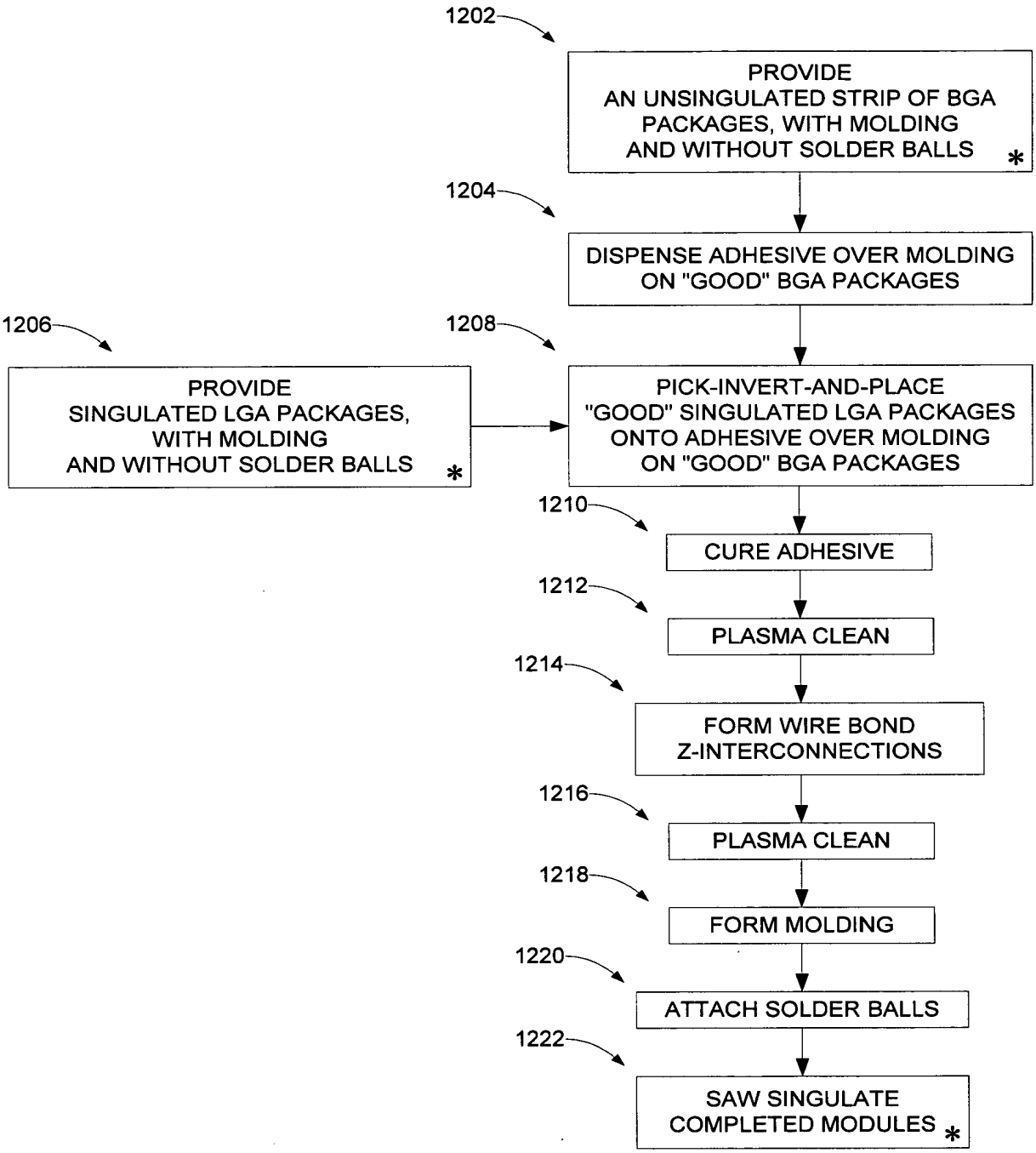


Fig. 11D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PROVIDE
AN UNSINGULATED STRIP OF BGA
PACKAGES, WITH MOLDING
AND WITHOUT SOLDER BALLS *
1204
DISPENSE ADHESIVE OVER MOLDING
ON "GOOD" BGA PACKAGES
1206
PROVIDE
SINGULATED LGA PACKAGES,
WITH MOLDING
AND WITHOUT SOLDER BALLS *
1208
PICK-INVERT-AND-PLACE
"GOOD" SINGULATED LGA PACKAGES
ONTO ADHESIVE OVER MOLDING
ON "GOOD" BGA PACKAGES
1210
CURE ADHESIVE
1212
PLASMA CLEAN
1214
FORM WIRE BOND
Z-INTERCONNECTIONS
1216
PLASMA CLEAN
1218
FORM MOLDING
1220
ATTACH SOLDER BALLS
1222
SAW SINGULATE
COMPLETED MODULES *

Fig. 12

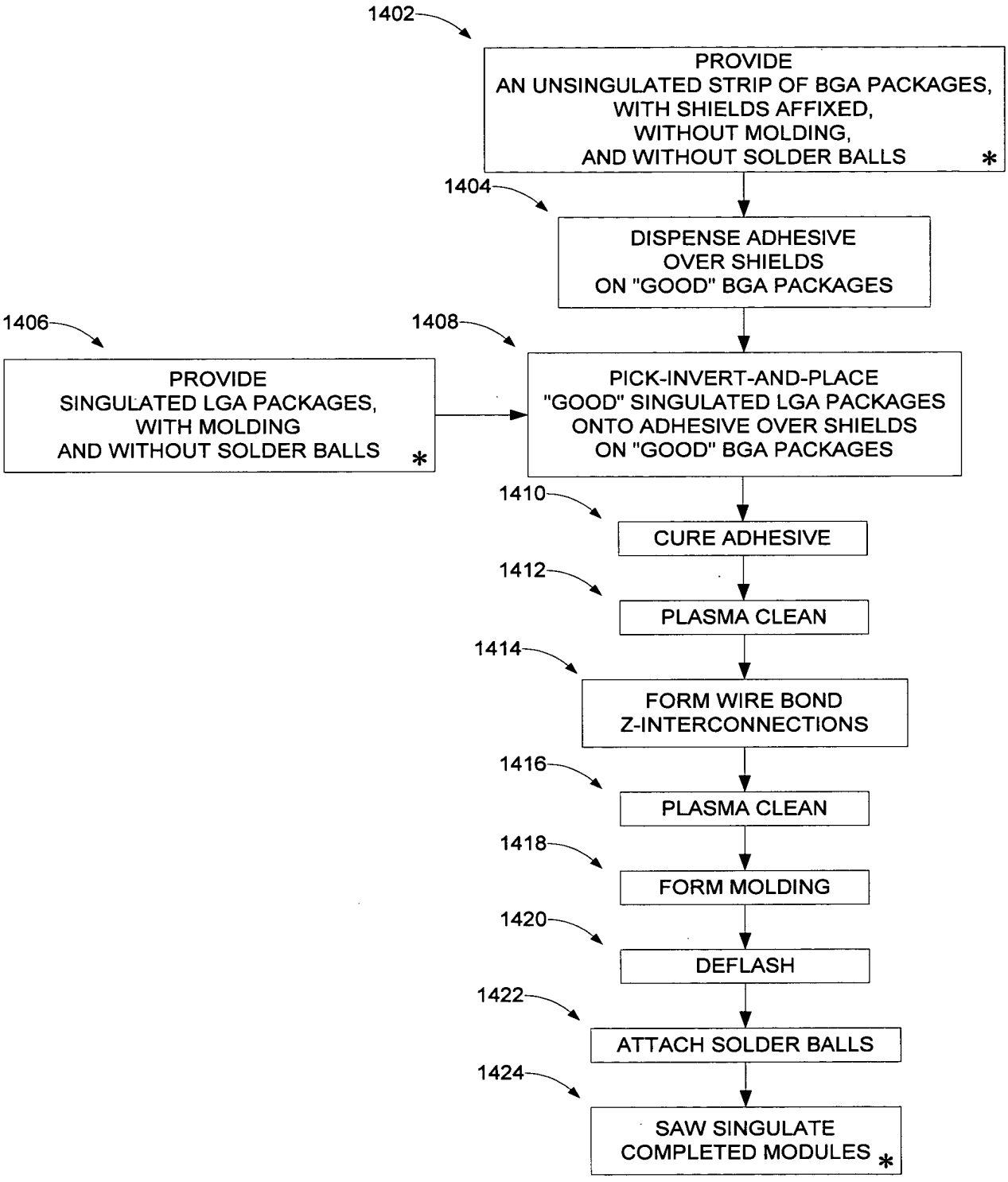

1402
PROVIDE
AN UNSINGULATED STRIP OF BGA PACKAGES,
WITH SHIELDS AFFIXED,
WITHOUT MOLDING,
AND WITHOUT SOLDER BALLS *
1404
DISPENSE ADHESIVE
OVER SHIELDS
ON "GOOD" BGA PACKAGES
1406
PROVIDE
SINGULATED LGA PACKAGES,
WITH MOLDING
AND WITHOUT SOLDER BALLS *
1408
PICK-INVERT-AND-PLACE
"GOOD" SINGULATED LGA PACKAGES
ONTO ADHESIVE OVER SHIELDS
ON "GOOD" BGA PACKAGES
1410
CURE ADHESIVE
1412
PLASMA CLEAN
1414
FORM WIRE BOND
Z-INTERCONNECTIONS
1416
PLASMA CLEAN
1418
FORM MOLDING
1420
DEFLASH
1422
ATTACH SOLDER BALLS
1424
SAW SINGULATE
COMPLETED MODULES *

Fig. 13

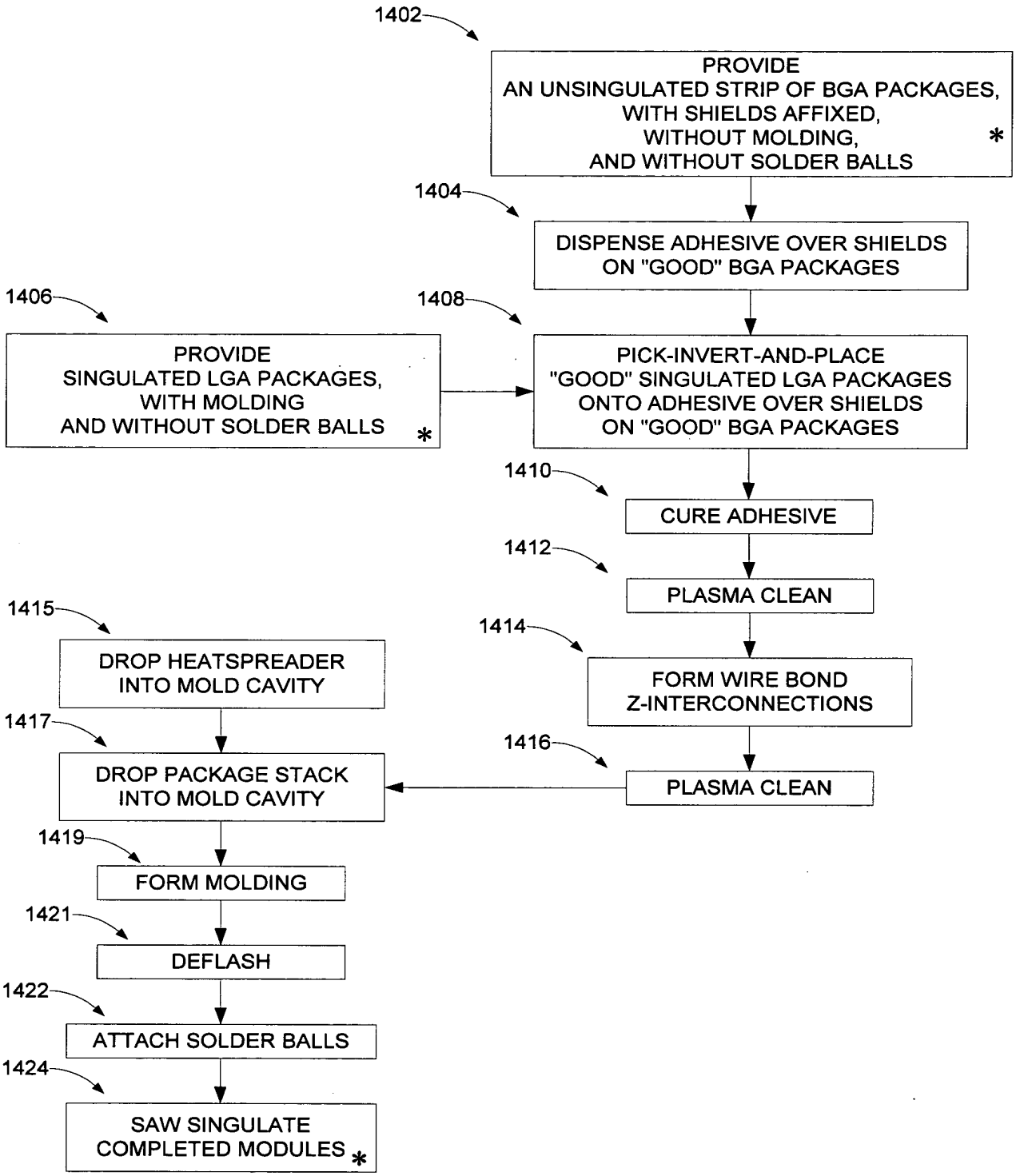

1402
PROVIDE
AN UNSINGULATED STRIP OF BGA PACKAGES,
WITH SHIELDS AFFIXED,
WITHOUT MOLDING,
AND WITHOUT SOLDER BALLS *
1404
DISPENSE ADHESIVE OVER SHIELDS
ON "GOOD" BGA PACKAGES
1406
PROVIDE
SINGULATED LGA PACKAGES,
WITH MOLDING
AND WITHOUT SOLDER BALLS *
1408
PICK-INVERT-AND-PLACE
"GOOD" SINGULATED LGA PACKAGES
ONTO ADHESIVE OVER SHIELDS
ON "GOOD" BGA PACKAGES
1410
CURE ADHESIVE
1412
PLASMA CLEAN
1414
FORM WIRE BOND
Z-INTERCONNECTIONS
1416
PLASMA CLEAN
1415
DROP HEATSPREADER
INTO MOLD CAVITY
1417
DROP PACKAGE STACK
INTO MOLD CAVITY
1419
FORM MOLDING
1421
DEFLASH
1422
ATTACH SOLDER BALLS
1424
SAW SINGULATE
COMPLETED MODULES *

Fig. 14

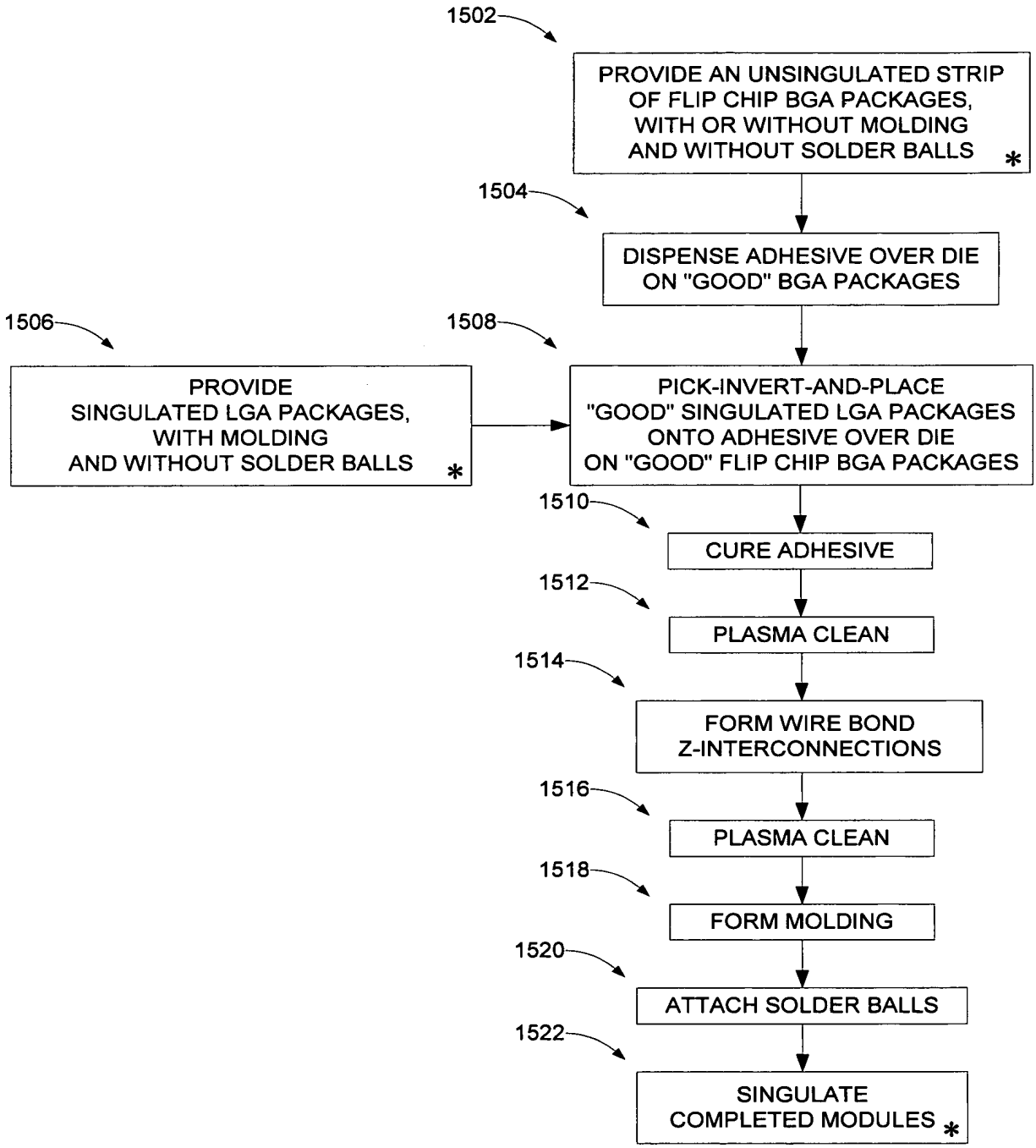
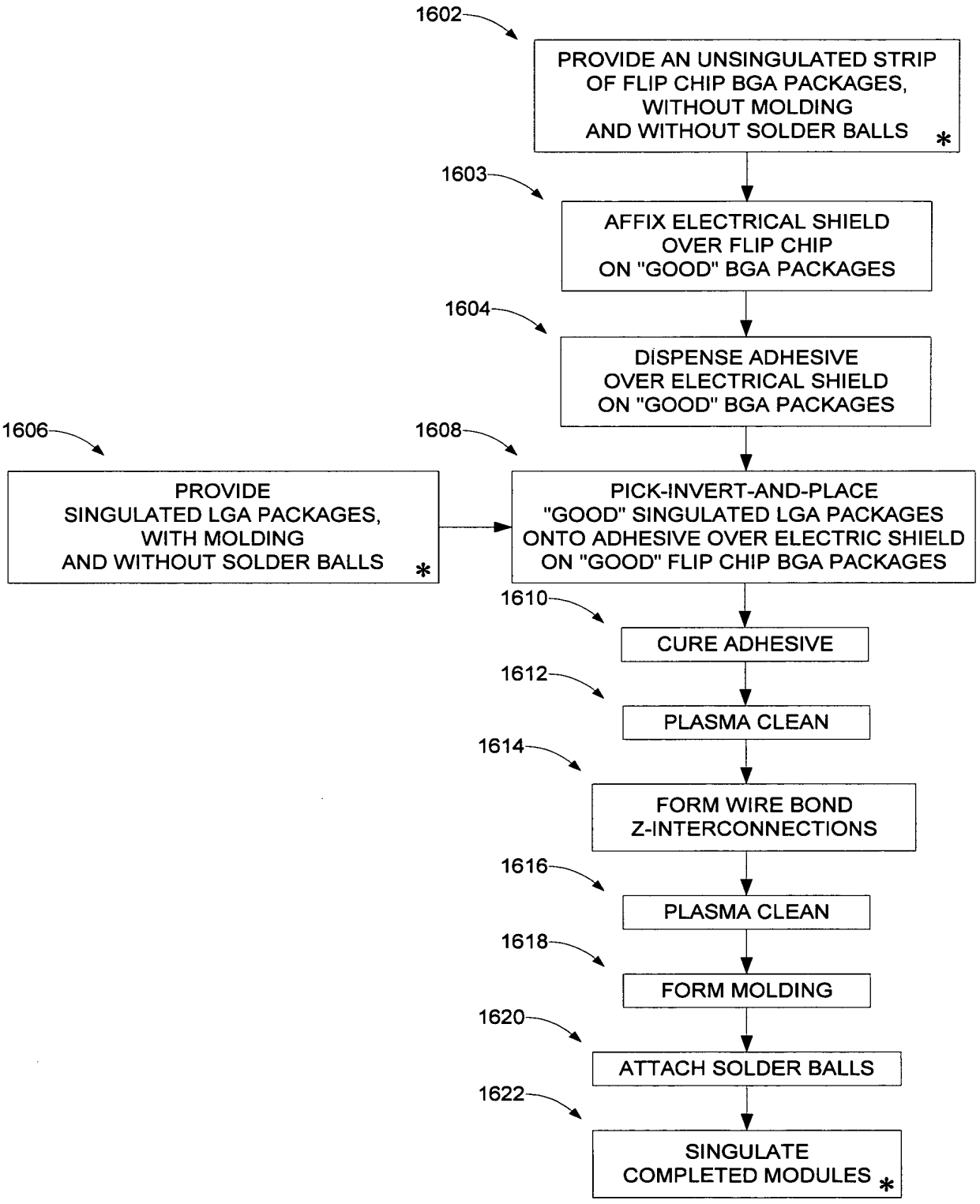

1502
PROVIDE AN UNSINGULATED STRIP OF FLIP CHIP BGA PACKAGES, WITH OR WITHOUT MOLDING AND WITHOUT SOLDER BALLS *
1504
DISPENSE ADHESIVE OVER DIE ON "GOOD" BGA PACKAGES
1506
PROVIDE SINGULATED LGA PACKAGES, WITH MOLDING AND WITHOUT SOLDER BALLS *
1508
PICK-INVERT-AND-PLACE "GOOD" SINGULATED LGA PACKAGES ONTO ADHESIVE OVER DIE ON "GOOD" FLIP CHIP BGA PACKAGES
1510
CURE ADHESIVE
1512
PLASMA CLEAN
1514
FORM WIRE BOND Z-INTERCONNECTIONS
1516
PLASMA CLEAN
1518
FORM MOLDING
1520
ATTACH SOLDER BALLS
1522
SINGULATE COMPLETED MODULES *

Fig. 15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PROVIDE AN UNSINGULATED STRIP OF FLIP CHIP BGA PACKAGES, WITHOUT MOLDING AND WITHOUT SOLDER BALLS *
1603
AFFIX ELECTRICAL SHIELD OVER FLIP CHIP ON "GOOD" BGA PACKAGES
1604
DISPENSE ADHESIVE OVER ELECTRICAL SHIELD ON "GOOD" BGA PACKAGES
1606
PROVIDE SINGULATED LGA PACKAGES, WITH MOLDING AND WITHOUT SOLDER BALLS *
1608
PICK-INVERT-AND-PLACE "GOOD" SINGULATED LGA PACKAGES ONTO ADHESIVE OVER ELECTRIC SHIELD ON "GOOD" FLIP CHIP BGA PACKAGES
1610
CURE ADHESIVE
1612
PLASMA CLEAN
1614
FORM WIRE BOND Z-INTERCONNECTIONS
1616
PLASMA CLEAN
1618
FORM MOLDING
1620
ATTACH SOLDER BALLS
1622
SINGULATE COMPLETED MODULES *

Fig. 16

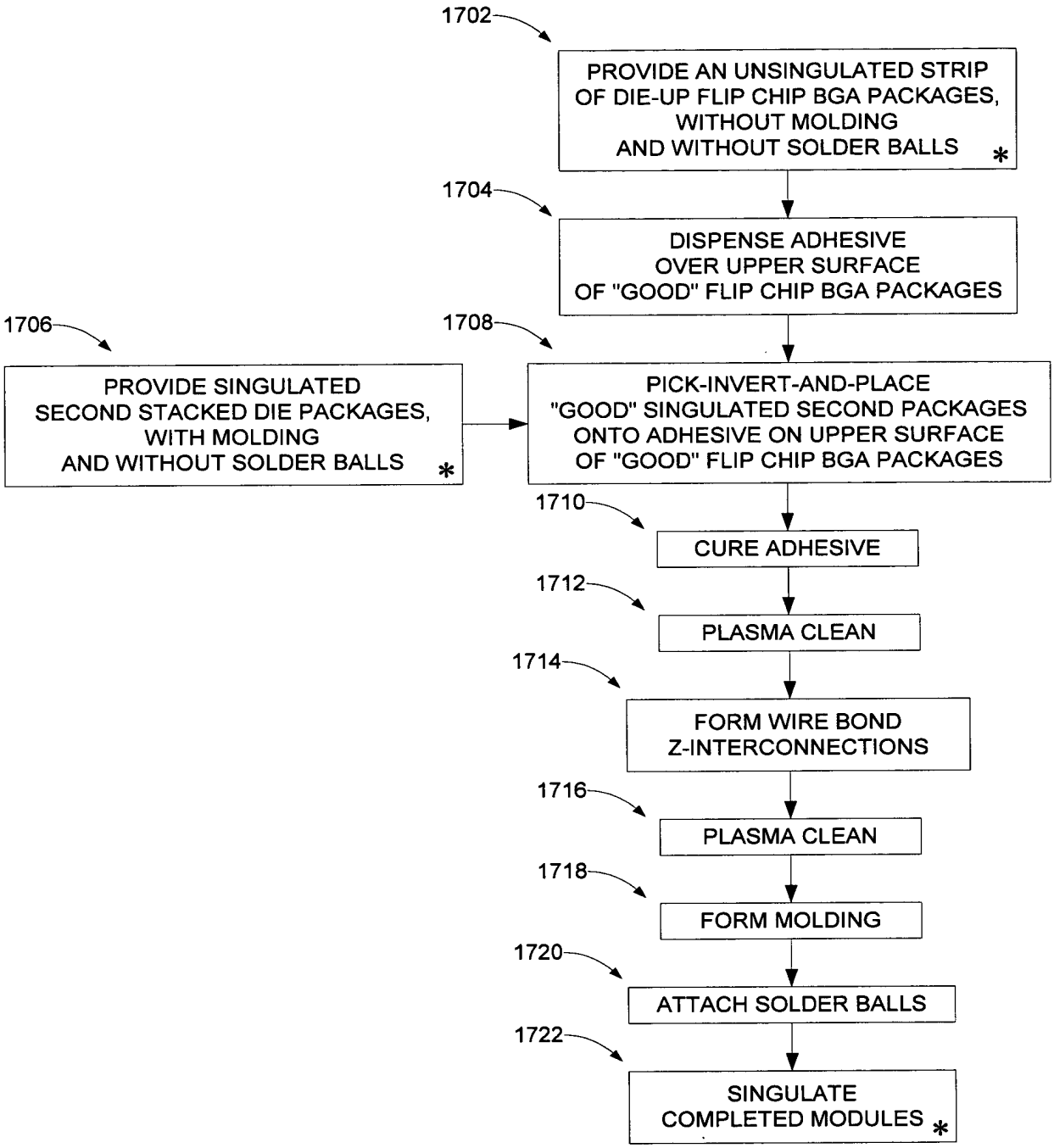
1702
PROVIDE AN UNSINGULATED STRIP OF DIE-UP FLIP CHIP BGA PACKAGES, WITHOUT MOLDING AND WITHOUT SOLDER BALLS *
1704
DISPENSE ADHESIVE OVER UPPER SURFACE OF "GOOD" FLIP CHIP BGA PACKAGES
1706
PROVIDE SINGULATED SECOND STACKED DIE PACKAGES, WITH MOLDING AND WITHOUT SOLDER BALLS *
1708
PICK-INVERT-AND-PLACE "GOOD" SINGULATED SECOND PACKAGES ONTO ADHESIVE ON UPPER SURFACE OF "GOOD" FLIP CHIP BGA PACKAGES
1710
CURE ADHESIVE
1712
PLASMA CLEAN
1714
FORM WIRE BOND Z-INTERCONNECTIONS
1716
PLASMA CLEAN
1718
FORM MOLDING
1720
ATTACH SOLDER BALLS
1722
SINGULATE COMPLETED MODULES *

Fig. 17

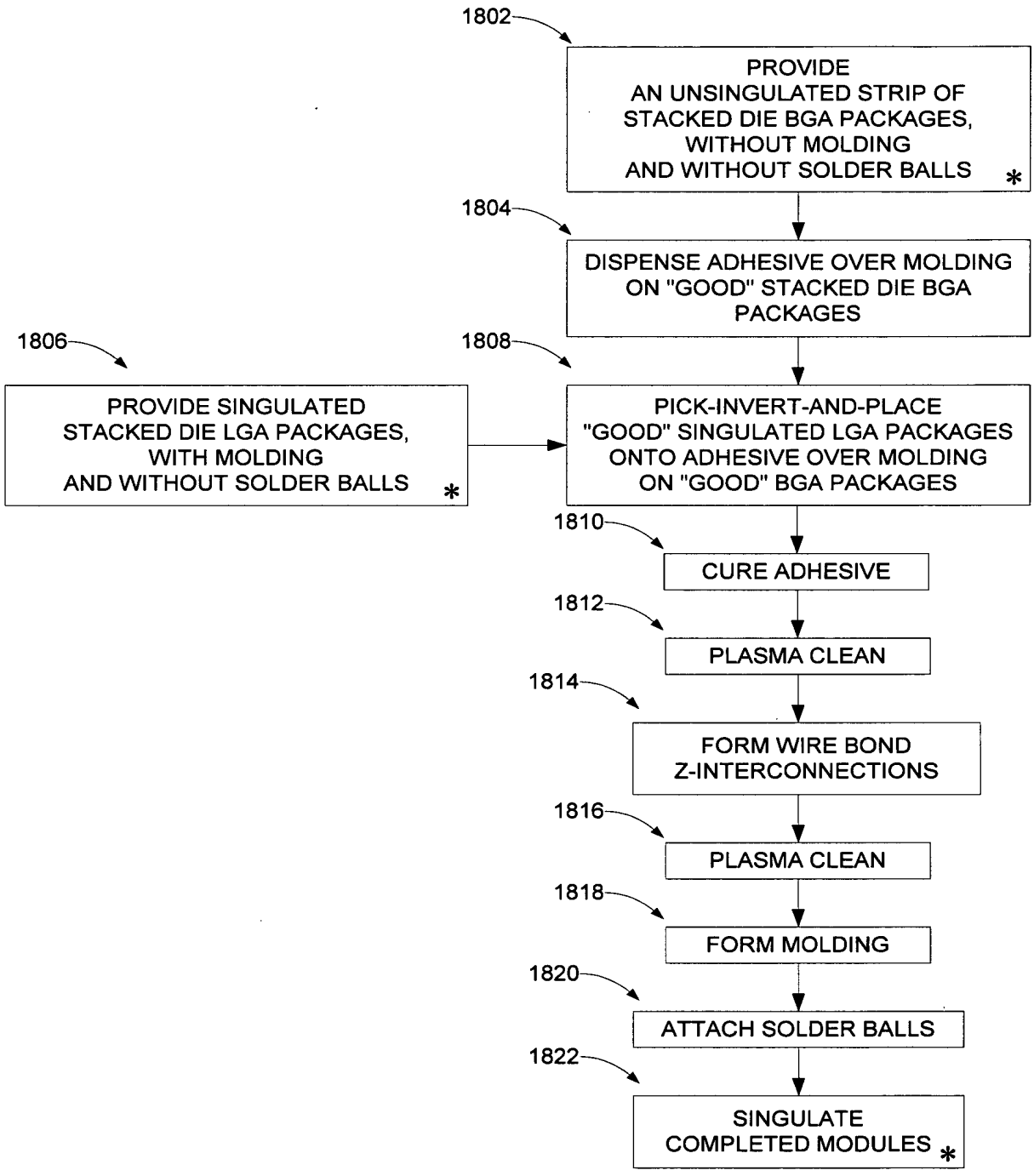
1802
PROVIDE AN UNSINGULATED STRIP OF STACKED DIE BGA PACKAGES, WITHOUT MOLDING AND WITHOUT SOLDER BALLS *
1804
DISPENSE ADHESIVE OVER MOLDING ON "GOOD" STACKED DIE BGA PACKAGES
1806
PROVIDE SINGULATED STACKED DIE LGA PACKAGES, WITH MOLDING AND WITHOUT SOLDER BALLS *
1808
PICK-INVERT-AND-PLACE "GOOD" SINGULATED LGA PACKAGES ONTO ADHESIVE OVER MOLDING ON "GOOD" BGA PACKAGES
1810
CURE ADHESIVE
1812
PLASMA CLEAN
1814
FORM WIRE BOND Z-INTERCONNECTIONS
1816
PLASMA CLEAN
1818
FORM MOLDING
1820
ATTACH SOLDER BALLS
1822
SINGULATE COMPLETED MODULES *

Fig. 18